

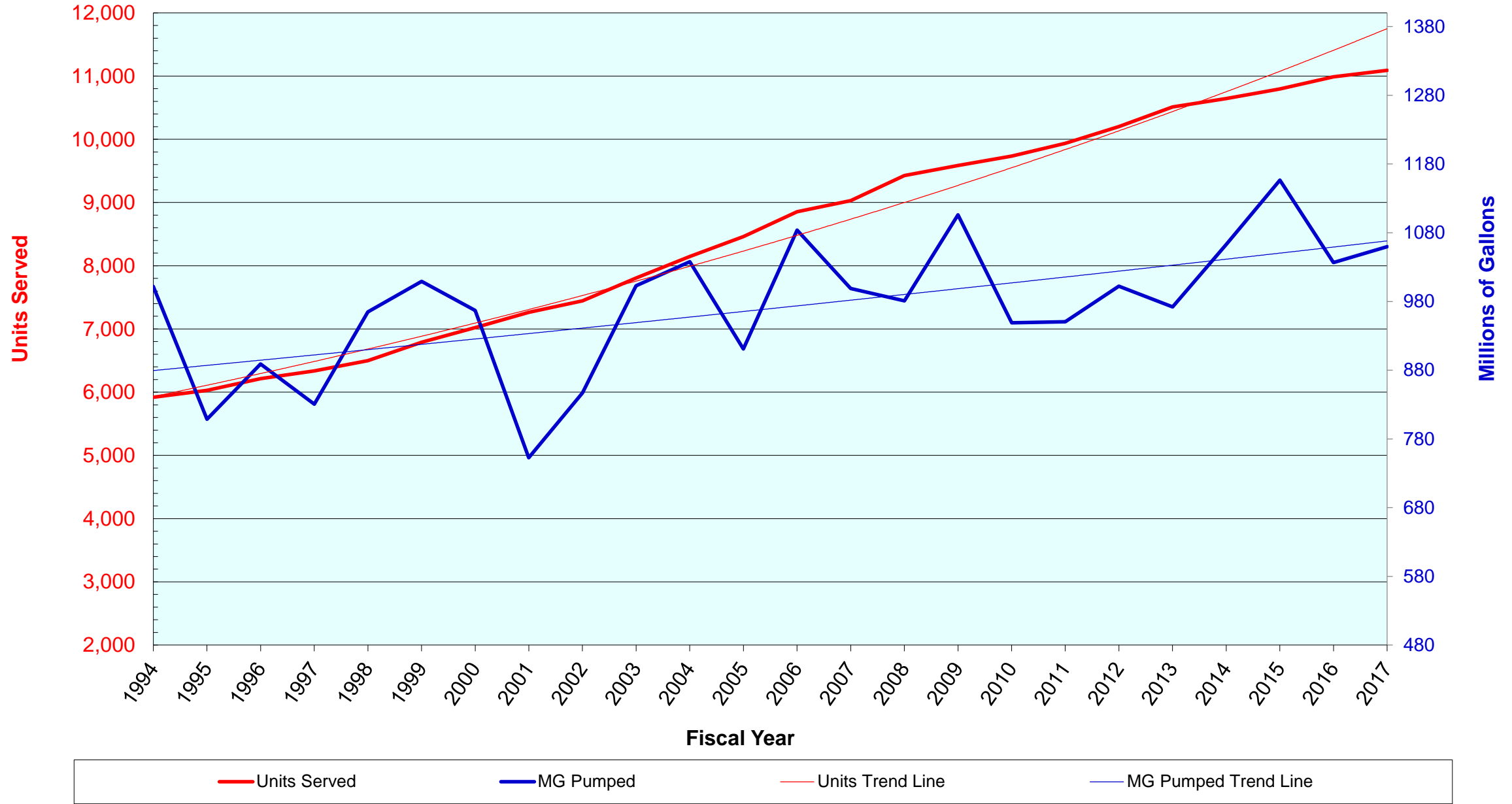
Foster Pilot Project Spanaway Water Company

USGS Modeling of Surface /
Ground Water for Mitigation
Determinations in the
Chambers/Clover Creek WRIA 12

Spanaway Water Company – History/Background

- Third largest non-profit mutual, &
- Fiftieth largest public water system in state.
- Entirely ground water with 11 wells (140 to 1,550 GPM)
- 180 % growth in 25 years to 11,218 connections – system converted from rural to suburban
- Only 5.8 % growth in pumped water (1994-2017) with conservation!
 - 32.4 % decrease in average day water use
 - 46.4 % decrease in peak day water use
 - 77.6 % decrease in unaccounted water
- Water Rights = 4,067.5 acft, maximum used 3,602 acft
- Up to 3% growth per year coming through 2035 resulting in -
Another 79% in growth, but water supply short as soon as 2023

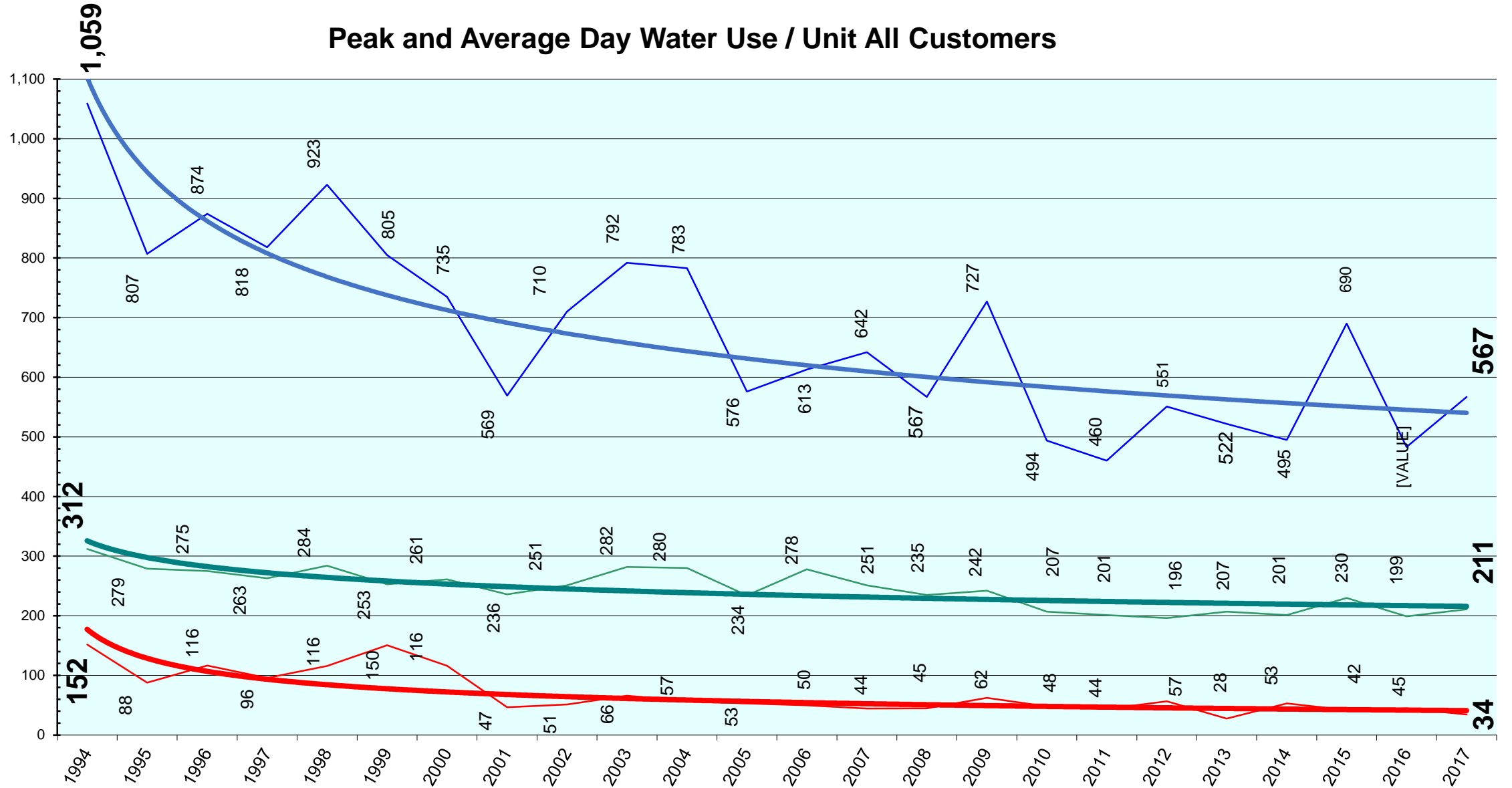
Annual Production and Units Served



Peak and Average Day Water Use / Unit All Customers

Gallons Per Day / Unit

Fiscal Year



Average Day

Peak Day

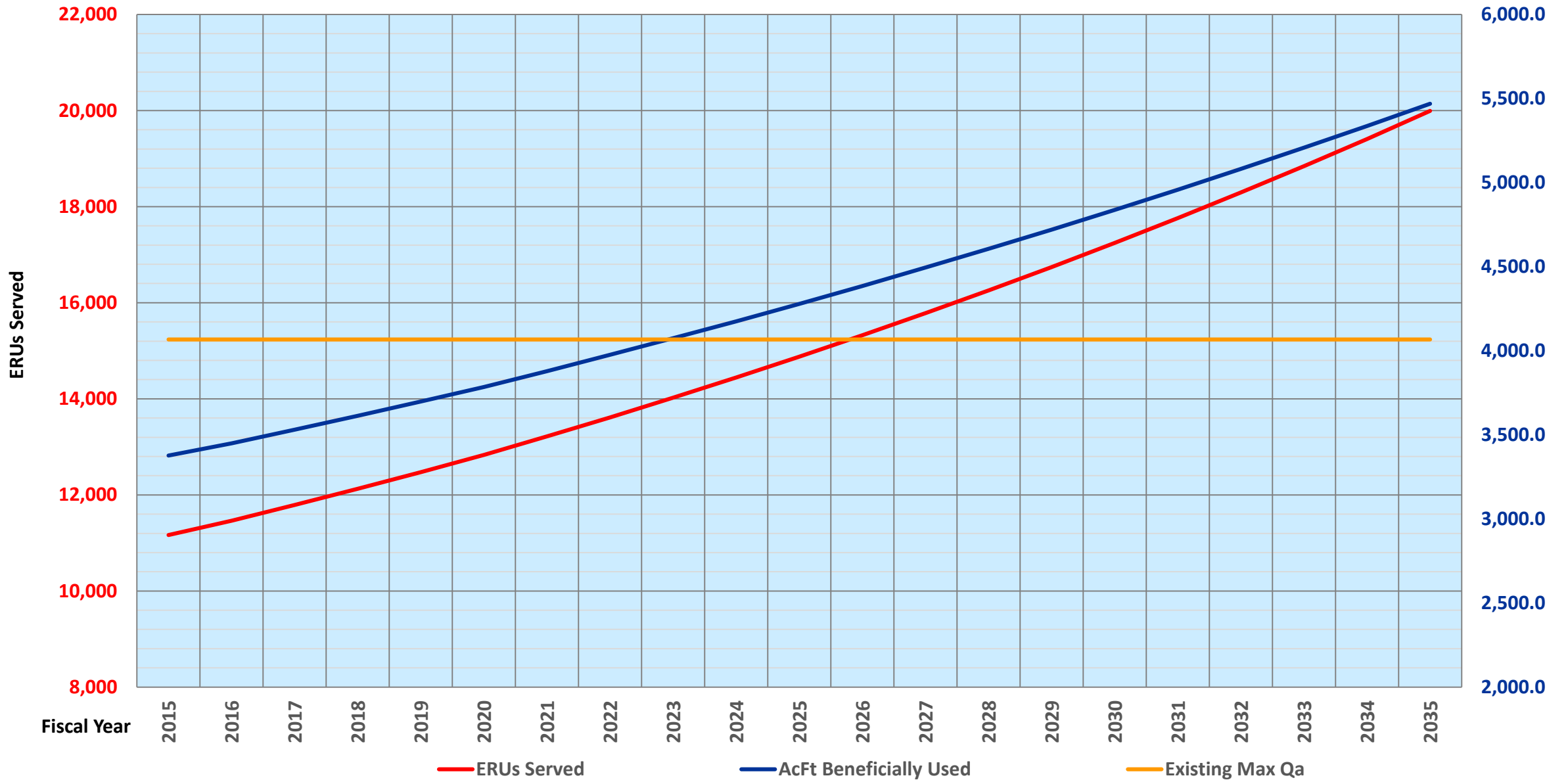
Unaccounted Use

Average Day GPD Trend

Peak Day GPD Trend

Unaccounted GPD Trend

2015 to 2035 **Growth**, **Existing Qa**, and **Water Demand**



2010/19 USGS Chamber/Clover Creek Models

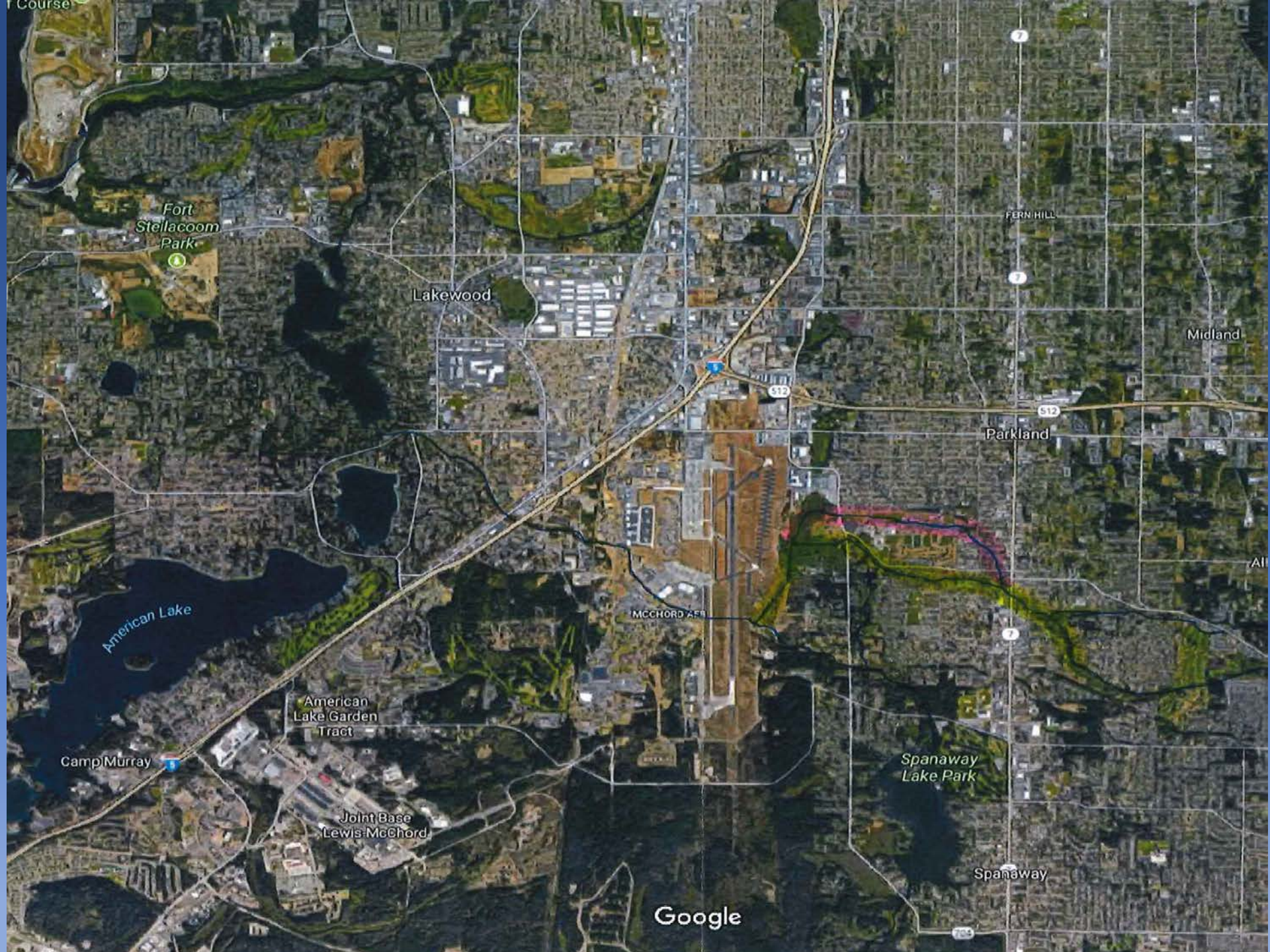
- 2010 Model – five-year project funded 50% by USGS and 50% by project partners including Pierce Conservation District , Dept. of Ecology, and seven utilities – final cost \$1,129,950.
- Limitations: 1,000 ft. cells, based on two years records (plus some earlier), use of “river cells”, spring and seep flows generally excluded.
- Project partners continued monitoring 2010 to present.
- 2019 model update, much lengthier data set, merged with USGS Puyallup model, using “stream” cells, inclusion of springs and seeps.
- Model completion for scenario runs in late spring 2019
- Funding by USGS, Pierce County, Depts. Of Health and Ecology, and eight utilities – final cost \$651,800.

Spanaway's Project Goals

Use current and updated USGS models to determine surface water impacts of additional withdrawals allowing:

1. Determination of the feasibility of proposed project -
Conversion of up to 2,000 acft of existing non-additive water rights to primary rights,
2. Provide in kind, in time, but not necessarily in place replacement mitigation water for model determined surface water impacts,
3. Mitigation to be completed in areas with viable aquatic habitat for the improvement of salmonid fishery and related aquatic habitat,
4. Mitigation may be via acquired/retired existing right, groundwater streamflow augmentation, or possibly some out of kind measures.

The
Clover
Creek
Area:
McChord
AFB is
in the
center

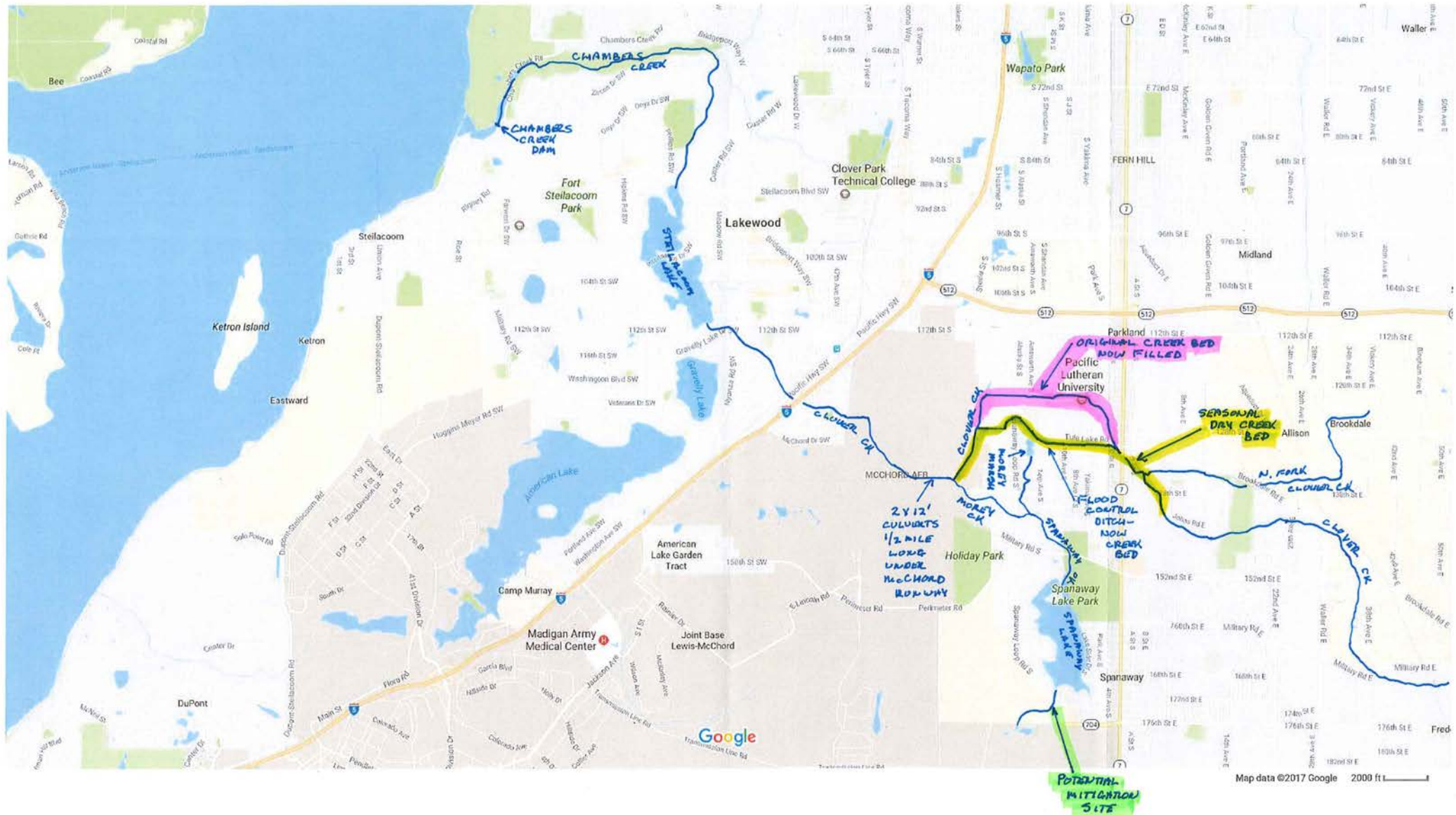


Current Clover Creek Conditions

- Fisheries: All chinook captured at Chambers Creek dam, coho, steelhead, and cutthroat allowed to pass – 400 to 700 per year.
- Creek rerouted to asphalt bottomed flood control ditch in 1940s between 138th St E and eastern McChord AFB.
- Area west of Spanaway Loop Road, wet year round with Morey Creek, Spanaway Creek, and Morey Ponds and marshes as viable habitat.
- Clover Creek east of Spanaway Loop Road to 138th St E dry by May (or earlier) through at least the end of September.
- Pilot project goal is to improve salmonid habitat in the area to the west of Spanaway Loop Road

Google Maps

Clover Creek Dry and Altered Area Map



Clover Creek at Spanaway Loop Road – West Side



West Side April 11, 2017



Clover Creek at Spanaway Loop Road – West Side



Clover Creek — New channel alignment.

1967 Stream Channel Relocated



West Side June 7, 2018



Clover Creek at SR7 (Pacific Ave.) – East Side



East Side April 11, 2017

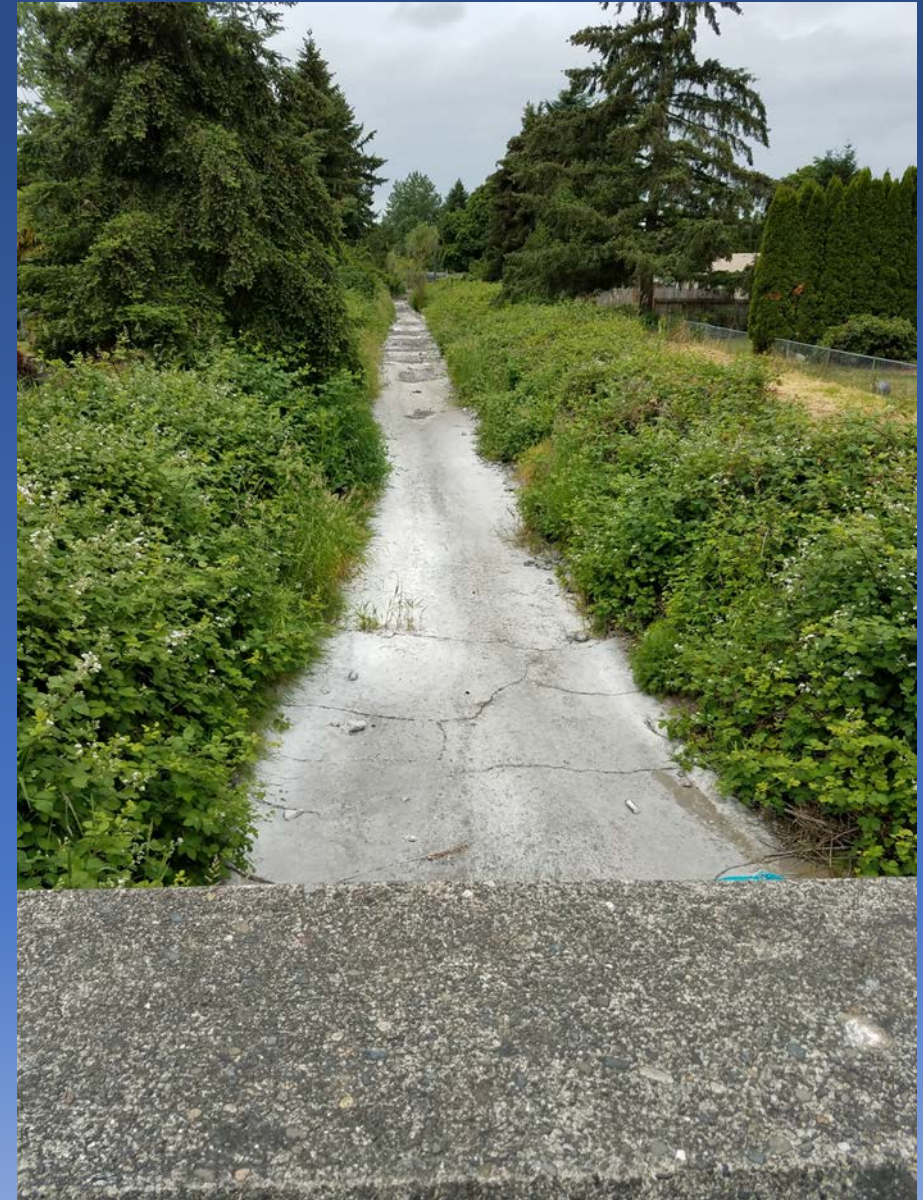


Clover Creek east of Spanaway Loop Road

East Side of SR7 –
October 16, 2017



West Side of C St S at 131st
St E – June 7, 2018



Preliminary USGS Modeling – 2010 Model Use

- Is it possible to convert 2,000 acft/year of existing non-additive water rights to primary water rights?
- Base line determined using existing authorized water rights.
- Modeling indicates that conversion of non-additive rights in the A3, C and E aquifers could, after 20 years, cumulatively impact stream flows up to 58% of additional well production, or 1,150 acft/yr.
- Acknowledged that 2010 model does not account for spring flow - forcing vertical flow and greater stream impacts.
- Requested that existing 2010 model be used to examine degree of impact from deeper withdrawals in E and G aquifers.

2019 USGS Model Update Improvements

- Greater data sets 2006 – 2016 utilized
- Use of “stream cells” allowing representation of seasonally stream flow variation, including allowing streams to go dry (like Clover Creek actually does)
- Finer cell grid, 500 foot cell size
- Inclusion of spring and seep flows which will better represent horizontal and vertical ground water flows
- Greater model confidence in all respect

2019 USGS and All Model Limitations

- Generally regional in nature unless specifically for a given site with greater local detail required.
- May have mathematically computed quantities across basin boundaries strictly as a result of the mathematical computations and within model error and uncertainty (model noise).
- All models will have some degree of error/uncertainty but must still be considered best available science if open process with peer review.
- Water management planning should address and/or allow the accommodation of model uncertainty in management decisions instead of assuming 100% model confidence as currently appears to be the case with regulators.

2019 USGS Model – Pilot Project Use Feasibility Determination

1. Remodel impacts of existing non-additive water right conversion.
2. Model surface water impacts of potential withdrawals from deeper E and/or G aquifers.
3. Determine whether quantitative impacts can feasible be addressed.
4. Evaluate preliminary potential for stream augmentation.

Pilot Project Development

If mitigation determined to be feasible:

- Water right application submitted to Dept. of Ecology.
- Consultation process with project team including Dept. of Ecology, Department of Fish and Wildlife, Puyallup Tribe, Nisqually Tribe, related fisheries/habitat biologists, and other interested stakeholders.
- Peer review of model process and equivalent of Cost Reimbursement Phase II review.
- Draft Report of Examination prepared for consultation project team review.
- Dept. of Ecology process of application in compliance with ESSB 6091.

? ? ? Questions ? ? ?

Thank You

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